What is claimed is:

1. A control system comprising:

an optical filter including at least one filter element;

an optical amplifier coupled to the optical filter;

an optical sensing device coupled to the optical filter; and,

a secondary control system coupled to the optical sensing device and the optical filter.

2. The control system of claim 1, wherein the optical sensing device comprises an optical channel monitor.

3. The control system of claim 1, wherein optical sensing device comprises an optical spectrum analyzer.

4. The control system of claim 1, wherein optical sensing device comprises a wave meter.

5. The control system of claim 1, wherein the secondary control system controls the voltage applied to the at least one filter element of the optical filter.

6. The control system of claim 1, wherein the optical sensing device monitors the output voltage of the at least one filter element.

7. The control system of claim 1, wherein the optical sensing device monitors the output current of the at least one filter element.

8. The control system of claim 1, wherein the secondary control system includes an electrical power monitoring system which operates to maintain the power applied to the at least one filter element.

9. The control system of claim 1, wherein the secondary control system comprises:

a microcontroller;

an analog-to-digital converter coupled to the microcontroller for delivering at least one analog signal to the microcontroller in digital format; and,

a digital-to-analog converter coupled to the microcontroller for converting at least one digital signal from the microcontroller to at least one analog control signal.

10. The control system of claim 9, wherein the analog-to-digital converter converts an analog voltage associated with the at least one filter element into a digital reference voltage.

11. The control system of claim 9, wherein the digital-to-analog converter converts an digital voltage value produced by the microprocessor into a analog drive voltage for application to the at least one filter element.

12. The control system of claim 1, wherein the secondary control system has at least three modes of operation, including:

a first mode wherein an optical spectrum of the optical filter is adjusted based on data from the optical sensing device;

a second mode wherein the optical spectrum of the optical filter is maintained based on the data received from the optical sensing device; and,

a third mode wherein an attenuation profile is applied to the optical filter under command from a microprocessor.

13. A method controlling the gain of an optical filter, comprising the steps of:

transmitting a signal from an optical filter to an optical amplifier;

monitoring the output of the optical amplifier;

providing feedback to a secondary control system coupled to the optical filter, said feedback indicating an output voltage of at least one element of the optical filter.

14. The method of claim 13, comprising the further step of:

determining in the secondary control system, from the output voltage of the at least one element of the optical filter, whether a power drive signal should be applied to the at least one element.

15. The method of claim 13, wherein the at least one element of the optical filter comprises a plurality of elements.

16. A method controlling an optical filter, comprising the steps of:

setting an initial state of a control system for controlling the optical filter;

setting an optical spectrum profile for the optical filter to either an initial profile or a stored profile;

compensating for ambient temperature changes; and,

initializing a power controller for controlling the power applied to different elements of the optical filter.

17. The method of claim 16, comprising the further step of:

compensating for thermal crosstalk between elements of the optical filter.

18. The method of claim 16, comprising the further step of:

compensating for resistance changes in the resistance of at least one element of the optical filter.

19. The method of claim 16, wherein the step of compensating for ambient temperature changes comprises compensating for ambient temperature changes utilizing a thermoelectric cooler.

20. The method of claim 16, wherein the power controller performs the following steps in controlling the power applied to the different elements of the optical filter:

selecting a desired filter element of the optical filter;

receiving a current value for the selected filter element;

receiving a voltage value for the selected filter element;

calculating a power associated with the selected filter element;

determining if the calculated power is within acceptable limits; and

transmitting a power control signal to the selected filter element if the calculated power is not within acceptable limits.

21. An optical transmission system comprising:

a plurality of optical transmission lines coupled to a wave division multiplexer, said wave division multiplexer selectively transmitting a plurality of optical signals to an optical filter;

an optical amplifier coupled to the optical filter;

an optical sensing device coupled to the optical filter; and,

a secondary control system coupled to the optical sensing device and the optical filter.

22. The optical transmission system of claim 21, further comprising an optical amplifier coupled between the wave division multiplexer and the optical filter.